

---

---

वस्त्रादि — फुलाये जा सकने योग्य उपकरणों के  
लिये नाईलॉन के कपड़े — विशिष्टि  
( पहला पुनरीक्षण )

**Textiles — Nylon Fabrics for  
Inflatable Equipment — Specification**  
( *First Revision* )

ICS 59.080.30

© BIS 2023



भारतीय मानक ब्यूरो  
BUREAU OF INDIAN STANDARDS  
मानक भवन, 9 बहादुर शाह ज़फर मार्ग, नई दिल्ली - 110002  
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG  
NEW DELHI - 110002  
[www.bis.gov.in](http://www.bis.gov.in) [www.standardsbis.in](http://www.standardsbis.in)

## FOREWORD

This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Technical Textiles for Sportech Applications Sectional Committee, TXD 37 had been approved by the Textiles Division Council.

This standard was first published in 1977. This standard has been again revised to incorporate the following major changes:

- a) Requirements for water repellancy and puncture resistance have been incorporated;
- b) Sampling plan has been modified;
- c) References to Indian Standards have been updated; and
- d) BIS certification marking clause has been updated.

The composition of the committee responsible for the formulation of this standard is listed in Annex C.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 2022 'Rules for rounding off numerical values (*second revision*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

*Indian Standard***TEXTILES — NYLON FABRICS FOR INFLATABLE  
EQUIPMENT — SPECIFICATION***( First Revision )***1 SCOPE**

This standard prescribes the requirements for seven varieties of nylon fabrics. The fabric is suitable for the manufacture of inflatable life rafts and similar equipment generally after proofing with elastomers.

**2 REFERENCES**

The standards listed in Annex A contain provisions which, through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards listed in Annex A.

**3 MANUFACTURE****3.1 Yarn**

Continuous filament nylon, type 6 yarn shall normally

be used in the manufacture of the cloth. It shall have nominal spinners' twist only, unless otherwise required specifically for the manufacture.

**3.2 Cloth**

The cloth shall be woven uniformly and evenly. The selvages shall have the same tension as the remainder of the fabric and shall not be unduly thicker than the fabric. The selvages shall not fold on themselves nor present a corded edge effect. The fabric, if required, shall be scoured. Unless otherwise specified, the fabric shall be heat-set.

**4 REQUIREMENTS**

**4.1** The constructional particulars and other physical requirements of nylon fabric shall conform to the requirements given in Table 1.

**4.2** The cloth shall also conform to the chemical requirements specified in Table 2.

**Table 1 Constructional Particulars and Physical Requirements of Nylon Fabrics for Inflatable Equipment**  
(Clause 4.1)

Sl No.	Approximate Count of Warp and Weft Yarn Tex (or Denier)	Ends or Picks per cm, <i>Min</i>	Mass, g/m <sup>2</sup> <i>Max</i>	Puncture Resistance, N, <i>Min</i>	Breaking Strength on 5.0 × 20 cm strips, Warpway and Weftway, N (kg), <i>Min</i>	Length	Width	Weave
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
i)	5.0 tex (or 45 d)	40	58	10	440 (45)	100 m or as declared	As declared ± 1.0 cm	Plain
ii)	11.1 tex (or 100 d)	28	74	15	800 (82)			Plain
iii)	23.3 tex (or 210 d)	18	95	18	1 100 (112)			Plain
iv)	23.3 tex (or 210 d)	25	136	20	1 550 (158)			Plain or 2/3 twill
v)	46.7 tex (or 420 d)	16	168	22	2 000 (204)			Plain
vi)	93.3 tex (or 840 d) Plain or rip stop	10	280	25	2 600 (265)			Plain or ripstop
vii)	93.3 tex (or 840 d) Plain or matt	10	400	27	5 400 (550)			Plain or matt
Method of Test	IS 7702	IS 1963	IS 1964	Annex B	IS 1969 (Part 1)	IS 1954		Visual

NOTE — The count of yarn are given for the guidance of the manufacturer and may be altered provided other requirements of the fabric are met.

**Table 2 Chemical Requirements of Nylon Fabrics for Inflatable Equipment**  
(Clause 4.2)

Sl No.	Characteristic	Requirement	Method of Test
(1)	(2)	(3)	(4)
i)	Shrinkage, Percent, <i>Max</i>		
	a) For plain weave fabrics	2.0	On heating for 60 min at 150 °C ± 5 °C and then cooling at 20 °C for 60 min
	b) For other weave fabrics	4.0	at 65 percent RH.
ii)	Conductivity, micro-ohms, <i>Max</i>	150	IS 4420
iii)	pH value	5.0 to 8.0	IS 1390
iv)	Water soluble chlorides as NaCl, Percent, <i>Max</i>	0.1	IS 4202
v)	Water soluble sulphates as, Na <sub>2</sub> SO <sub>4</sub> , Percent, <i>Max</i>	0.25	IS 4203
vi)	Water repellency (by Bundesmann type apparatus)		IS 392
	a) Penetration, ml, <i>Max</i>	2	
	b) Absorption, percent, <i>Max</i>	30	
vii)	Colour fastness to light (Dyed fabrics only)	5 or better	IS/ISO 105-B01 or IS/ISO 105-B02
viii)	Colour fastness to washing (Dyed fabrics only)	4 or better	IS/ISO 105-E02

## 5 ATMOSPHERIC CONDITIONS FOR TESTING

**5.1** The tests shall be carried out in the standard atmosphere (see 5.2).

### 5.2 Conditioning of Test Specimen

The test samples shall be conditioned to a state of moisture equilibrium from dry state in standard atmosphere at (65 ± 5) percent relative humidity and (27 ± 2) °C temperature (see also IS 6359).

## 6 MARKING

**6.1** Each roll of fabric shall be legibly marked with the following information:

- Name of the material;
- Length and width of the fabric contained in a roll;
- Year of manufacture; and
- Manufacturer's name, initials or trade-mark, if any.

### 6.2 BIS Certification Marking

The product(s) conforming to the requirements of this standard may be certified as per the conformity

assessment schemes under the provisions of the *Bureau of Indian Standards Act, 2016* and the Rules and Regulations framed thereunder, and the product(s) may be marked with the Standard Mark.

## 7 PACKING

Unless otherwise specified in contract or order, the rolls of the nylon fabric shall be packed in accordance with the provisions laid down in IS 2195 or IS 2194 as applicable.

## 8 SAMPLING

**8.1** The lot shall consist of all the rolls of fabric delivered to a buyer against one dispatch note.

**8.2** Unless otherwise sampling plan is specified in the contract or order, the sampling plan as given in Table 3 may be used for inspecting and testing of fabric against this standard. The number of rolls to be selected from the lot for assessing manufacture (see 3.1 and 3.2) and testing length, width, ends, picks and weight shall be as per col (2) of Table 3. The number of test specimens to be selected for other tests shall be in accordance with col (4) of Table 3. To ensure the randomness of selection, IS 4905 may be followed.

**8.3 Criteria for Conformity**

The lot shall be declared conforming to the requirements of this standard if the total number of

defective samples does not exceed the permissible numbers given in col (3) or col (5) of Table 3 as applicable.

**Table 3 Sampling Plan for Nylon Fabrics for Inflatable Equipment**  
(Clause 8.2)

Sl No.	Lot Size	Sample Size	Permissible No. of Defectives Samples	Sub-Sample Size (to be drawn from sample)	Permissible No. of Defectives
(1)	(2)	(3)	(4)	(5)	(6)
i)	2 to 25	3	0	3	0
ii)	26 to 90	13	1	3	0
iii)	91 to 150	20	2	13	1
iv)	151 to 280	32	3	13	1
v)	281 to 500	50	5	20	1
vi)	501 to 1 200	80	7	32	2
vii)	1 201 and above	125	10	50	3
NOTE — If sample size equals or exceeds lot size, carry out 100 percent inspection.					

**ANNEX A**  
(Clause 2)

**LIST OF REFERRED STANDARDS**

<i>IS No./Other publications</i>	<i>Title</i>	<i>IS No./Other publications</i>	<i>Title</i>
IS 1390 : 2022	Textiles — Determination of pH of aqueous extract ( <i>second revision</i> )	IS 4202:2022	Method for determination of chloride content of textile materials ( <i>first revision</i> )
IS 1954 : 1990	Determination of length and width of woven fabrics — Methods ( <i>second revision</i> )	IS 4203:2022	Method for determination of sulphate content in textile materials ( <i>first revision</i> )
IS 1963 : 1981	Methods for determination of threads per unit length in woven fabrics ( <i>second revision</i> )	IS 4420:2022	Methods for determination of conductivity of aqueous and organic extracts of textile materials ( <i>first revision</i> )
IS 1964 : 2001	Textiles — Methods for determination of mass per unit length and mass per unit area of fabrics ( <i>second revision</i> )	IS 4905 : 2015	Random sampling and randomization procedures ( <i>first revision</i> )
IS 1969 (Part 1) : 2018	Textiles — Tensile properties of fabrics: Part 1 Determination of maximum force and elongation at maximum force using the strip method ( <i>fourth revision</i> )	IS 6359 : 2023	Method for conditioning of textiles ( <i>first revision</i> )
IS 2194 : 1963	Code for seaworthy packaging of man-made fibre fabrics	IS/ISO 105-B01 : 2014	Textiles — Tests for colour fastness: Part B01 Colour fastness to light: Daylight
IS 2195 : 1964	Code for inland packaging of man-made fibre fabrics and man-made fibre yarns	IS/ISO 105-B02 : 2014	Textiles — Tests for colour fastness: Part B02 Colour fastness to artificial light Xenon arc fading lamp test
		IS/ISO 105-E02 : 2013	Textile — Tests for colour fastness: Part E02 Colour fastness to sea water

**ANNEX B**  
(Table 1)

**METHOD FOR DETERMINATION OF PUNCTURE RESISTANCE**

**B-1 PRINCIPLE**

The force exerted by a steel stylus of defined dimensions to puncture a test specimen held on a retaining device is called puncture resistance. It should not be confused with piercing exerted by thin tips or needles.

**B-2 TEST SPECIMEN**

A circular test specimen with a minimum diameter of 40 mm is taken. The seams of the fabric are located outside the clamping area and the point of perforation.

**B-3 TEST METHOD**

- a) Clamp the test specimen centrally in the retaining device with the exterior surface towards the stylus;
- b) Move the stylus downwards onto the test

specimen at 100 mm/min. Continue until a displacement of 50 mm, measured from the sample level, is reached. Record the highest value of the force, even if the test specimen is not punctured;

- c) The test shall be performed on four specimens cut from four different parts of the fabrics; and
- d) The profile and measurements of the stylus shall be same for every test.

**B-4 TEST REPORT**

The test report shall contain the following information:

- a) The reference of the sample(s) that have been tested; and
- b) Record the measured value and the average of the 4 measured values.

**ANNEX C**  
(Foreword)

**COMMITTEE COMPOSITION**

Technical Textiles for Sportech Applications Sectional Committee, TXD 37

<i>Organization</i>	<i>Representative(s)</i>
Wool Research Association, Thane	DR (SHRIMATI) MRINAL CHOUDHARY ( <b>Chairperson</b> )
Archroma India Pvt Ltd, Thane	SHRI ANJANI PRASAD SHRI ALEX DHANADURAI ( <i>Alternate</i> )
Arvind Limited, Ahmedabad	DR KUNAL SHAH SHRI SATYAPRIYA DASH ( <i>Alternate</i> )
Bhabi Multifab Pvt Ltd	SHRI VIJAY ABHICHANDANI SHRI AJAY ABHICHANDANI ( <i>Alternate</i> )
Coir Board, Kochi	SHRIMATI ANITA JACOB MS SUMI SABESTIAN ( <i>Alternate</i> )
Garware Technical Fibres Ltd, Pune	DR VIJAY RAMAKRISHNAN DR A. ARPUTHARAJ ( <i>Alternate</i> )
ICAR - Central Institute for Research on Cotton Technology, Mumbai	DR T. SENTHILKUMAR SHRI G. T. VRINDAIAH ( <i>Alternate</i> )
Indian Institute of Technology, Delhi	PROF BIPIN KUMAR
Indian Jute Industries Research Association, Kolkata	SHRI PALASH PAUL SHRI PARTH SANYAL ( <i>Alternate</i> )
Indian Technical Textile Association	DR ANUP RAKSHIT SHRI SUNIL KUMAR ( <i>Alternate</i> )
Jasch Industries Ltd	SHRI S. K. VERMA
Kusumgar Corporates Pvt Ltd, Mumbai	SHRI SIDDHARTH Y. KUSUMGAR SHRIMATI ANITHA JEYARAJ ( <i>Alternate</i> )
Office of the Textile Commissioner, Mumbai	SHRI HUMAYUN K. SHRI JAGRAM MEENA ( <i>Alternate</i> )
SGS Ltd, Mumbai	DR KARTHIKEYAN K. SHRIMATI ANITHA JEYARAJ ( <i>Alternate</i> )
Sports Goods Manufacturers and Exporters Association, Jalandhar	SHRI VIPAN MAHAJAN SHRI AJAYA MAHAJAN ( <i>Alternate</i> )
Synthetic and Art Silk Mills Research Association, Mumbai	SHRI RAVI PRAKASH SINGH SHRI SANJAY SAINI ( <i>Alternate</i> )
Textiles Committee, Mumbai	DR P. RAVICHANDRAN
The Bombay Textile Research Association, Mumbai	SHRI AMOL THITE
Veermata Jijabai Technological Institute, Mumbai	DR SURANJANA GANGOPADHYAY



<i>Organization</i>	<i>Representative(s)</i>
Wool Research Association, Thane	SHRI MAYUR BASUK SHRIMATI SMITA BAIT ( <i>Alternate</i> )
BIS Directorate General	SHRI J. K. GUPTA, SCIENTIST 'E'/JOINT DIRECTOR AND HEAD (TEXTILES) [REPRESENTING DIRECTOR GENERAL ( <i>Ex-officio</i> )]
<i>Member Secretary</i> SHRI MAYUR KATIYAR SCIENTIST 'B'/ASSISTANT DIRECTOR (TEXTILES), BIS	





## Bureau of Indian Standards

BIS is a statutory institution established under the *Bureau of Indian Standards Act, 2016* to promote harmonious development of the activities of standardization, marking and quality certification of goods and attending to connected matters in the country.

### Copyright

BIS has the copyright of all its publications. No part of these publications may be reproduced in any form without the prior permission in writing of BIS. This does not preclude the free use, in the course of implementing the standard, of necessary details, such as symbols and sizes, type or grade designations. Enquiries relating to copyright be addressed to the Head (Publication & Sales), BIS.

### Review of Indian Standards

Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the website- [www.bis.gov.in](http://www.bis.gov.in) or [www.standardsbis.in](http://www.standardsbis.in).

This Indian Standard has been developed from Doc No.: TXD 37 (16934).

### Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

## BUREAU OF INDIAN STANDARDS

### Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002

Telephones: 2323 0131, 2323 3375, 2323 9402

Website: [www.bis.gov.in](http://www.bis.gov.in)

### Regional Offices:

	Telephones
Central : 601/A, Konnectus Tower -1, 6 <sup>th</sup> Floor, DMRC Building, Bhavbhuti Marg, New Delhi 110002	{ 2323 7617
Eastern : 8 <sup>th</sup> Floor, Plot No 7/7 & 7/8, CP Block, Sector V, Salt Lake, Kolkata, West Bengal 700091	{ 2367 0012 2320 9474
Northern : Plot No. 4-A, Sector 27-B, Madhya Marg, Chandigarh 160019	{ 265 9930
Southern : C.I.T. Campus, IV Cross Road, Taramani, Chennai 600113	{ 2254 1442 2254 1216
Western : Plot No. E-9, Road No.-8, MIDC, Andheri (East), Mumbai 400093	{ 2821 8093

**Branches :** AHMEDABAD. BENGALURU. BHOPAL. BHUBANESHWAR. CHANDIGARH. CHENNAI. COIMBATORE. DEHRADUN. DELHI. FARIDABAD. GHAZIABAD. GUWAHATI. HIMACHAL PRADESH. HUBLI. HYDERABAD. JAIPUR. JAMMU & KASHMIR. JAMSHEDPUR. KOCHI. KOLKATA. LUCKNOW. MADURAI. MUMBAI. NAGPUR. NOIDA. PANIPAT. PATNA. PUNE. RAIPUR. RAJKOT. SURAT. VISAKHAPATNAM.